The development of the federal government's role in flood control is largely the story of attempts to control the devastating floods along the lower Mississippi River. Aside from the swampland acts and whatever incidental alleviation of flooding resulted from snagging and clearing operations, the federal government did not involve itself in flood control on the Mississippi until the 1870s. In 1874, after a severe flood had wrought tremendous suffering on lower Mississippi basin residents, Congress appropriated $90,000 for relief work. That same year Congress also authorized the President to establish a commission of three Army Engineers and two civilian engineers to study the best system for the "permanent reclamation and redemption" of the alluvial basin of the Mississippi River. Three years later, Chief of Engineers Andrew A. Humphreys created a board to improve low-water navigation of the Mississippi and Missouri rivers. Both boards were eliminated upon the creation of the Mississippi River Commission (MRC) on 28 June 1879.

Congress established the MRC to coordinate river improvement work on the Mississippi and to insure that both civilian and military advice was obtained on the subject. The seven-member board was to be chosen by the President of the United States and confirmed by the Senate. The commission president and two other members were selected from the Corps of Engineers. The United States Coast and Geodetic Survey provided one member. The remaining three members, two of whom had to be civil engineers, came from civilian life. Among the duties Congress assigned the MRC were to prepare plans to deepen the channel and protect the banks of the Mississippi; "improve and give safety and ease" to Mississippi navigation; prevent destructive floods; and promote and facilitate commerce, trade, and postal service. Within a year, the MRC had reached the important conclusion that "levees only" could control the Mississippi's floods. Commission members rejected any suggestion of dispersing floods through controlled outlets. This conclusion reaffirmed the position of Humphreys and Lieutenant Henry L. Abbot who had expressed their faith in "levees only" in their Report Upon the Physics and Hydraulics of the Mississippi River, published in 1861. The authors had specifically questioned the value of reservoirs for flood control on the lower Mississippi.

Despite efforts by the MRC and local interests to construct levees fast enough and high enough to prevent flooding, periodic floods continued to devastate the lower Mississippi basin. Severe floods came in 1882, 1884, 1890, 1897, 1912, 1913, and 1916. Less severe floods, but still enormously disrupting, occurred in other years. The Corps of Engineers did the levee construction for the MRC, but the Corps was often more involved with emergency flood

relief activities than with construction. The Corps' first flood relief operation took place on the lower Mississippi in 1882. The 1912 and 1913 floods brought into question a system of levees that had clearly shown itself incapable of affording reliable protection. They also showed the inability of local interests to provide adequate protection to complement the work of the federal government.

Until 1917, all work done on the Mississippi had been justified on the basis of navigation, mainly in order to satisfy the constitutional scruples of those congressmen who thought the federal government had no business in flood control. However, on 1 March 1917, Congress passed the first federal flood control legislation. The measure authorized $45 million for flood control between the mouth of the Mississippi and the mouth of the Ohio; no more than $10 million was to be spent in any one year. Essentially the 1917 act allowed the MRC to expedite the implementation of already existing plans. No new flood control plans were authorized. The act, however, did stipulate that local interests must contribute at least one-half of the cost for the construction and repair of the levees and must provide rights-of-way free to the federal government. The act also appropriated $5.6 million for flood control work on the Sacramento River. At least in these two sections of the country, Congress had declared its commitment to flood control.

More flooding occurred on the lower Mississippi in the early 1920s. The flood that finally brought a reevaluation of policy--and of financing--happened in 1927. Between 250 and 500 people were killed, over 16 million acres flooded, and 41,000 buildings destroyed. The Red Cross cared for over 600,000 people at one time, of whom half lived in temporary Red Cross camps. The flood finally convinced the Corps that levees could not sufficiently control the Mississippi's waters: a mix of levees, floodways, and spillways would be necessary. Major General Edgar Jadwin, Chief of Engineers and author of this new flood control plan, continued to oppose reservoirs for flood control, however. A specially appointed reservoir board of Engineer officers concluded that the Jadwin plan was "far cheaper than any method the board has been able to devise for accomplishing the same result by any combination of reservoirs."

The flood control act passed on 15 May 1928 authorized this new plan, which came to be called the Mississippi River and Tributaries project. The act released lower Mississippi residents from all local cooperation requirements except those to maintain certain flood control works after completion, to accept certain lands condemned for the project, and to provide rights-of-way. The reason for this generous federal commitment is that many congressmen judged that the residents of the lower Mississippi had borne enough suffering; they had spent a substantial amount of money on nonfederal levee construction, and it was unreasonable to expect them to bear this burden longer.

In light of this congressional largesse, it is worthwhile to examine how much lower Mississippi basin residents had contributed to flood control and navigation improvement. According to one MRC document, state and local organizations spent over $175 million on nonfederal levees up to the year 1928. In addition, they contributed $19 million to federal levee and revetment projects, bringing the total nonfederal expenditure prior to 1928 to just under $200 million. Federal appropriations during this same period totaled $174 million. Of this amount, $93 million was spent prior to the passage of the 1917 flood control act. The remainder was appropriated either as special emergency flood relief funds or as amendments to the 1917 act. Under the provisions of the 1928 act, as amended, the federal government appropriated $1.1 billion through the fiscal year 1955. Local interests contributed $3.2 million.

The 1928 flood control act paved the way for much more ambitious planning, and the depression convinced many congressmen that federal flood control not only was justified in itself, but also could serve as an important means of providing work relief. In 1935, Congressman Riley Wilson of Louisiana introduced a bill to authorize a large number of flood control projects throughout the United States. Most of these projects had been suggested in the Corps' "308 reports" prepared pursuant to the 1927 Rivers and Harbors Act. Succumbing to the lure of work relief projects, the House of Representatives passed Wilson's bill; but opposition in the Senate was stronger. Senator Millard Tydings of Maryland blocked a vote by what supporters of the legislation called a "filibuster." In the next session, consequently, the Senate Committee on Commerce devoted a great deal of attention to drawing up a national policy on flood control.

The most controversial point was whether the federal government should assume the entire cost of flood control projects, as it had for the lower Mississippi under the 1928 flood control act. In the end, committee members agreed that the local interests should provide lands, rights-of-way, and easements and should hold and save the United States free from damages due to the construction work. Later, another stipulation was added: local interests should maintain and operate all the works after completion of the project in accordance with regulations prescribed by the Secretary of War. The three provisions--to provide land, rights-of-way, and easements; to stand the cost of damages; and to maintain and operate the works--became known as the "a,b,c" requirements. The decision that local interests should bear part of the burden resulted in part from the efforts of Senator Royal Copeland of New York and Senator Arthur Vandenberg of Michigan. Another factor was Chief of Engineers Major General Edward Markham, who was outspoken in his opinion that the federal government should not bear the entire cost.

A close reading of committee documents and congressional speeches makes clear the legislative intent to extend federal assistance only to prevent "catastrophic" and "dramatic" flood damages. It was not the intent to reclaim lands in rural areas. The Roosevelt administration, however, expressed its desire to have the bill broadened to provide for investigations by the Secretary of Agriculture of the value to flood control of reforestation, soil conservation, and other floodplain management measures. The subsequent changes made it clear that the Secretary of Agriculture would be responsible for investigating watersheds and recommending measures to control water retardation and run-off, while the Secretary of War would investigate and improve rivers for flood control, as directed by Congress.

After defeating efforts to have the federal government assume the full financial burden, the Senate passed the bill. In conference the bill was not significantly modified. On 22 June 1936, President Franklin D. Roosevelt signed the bill into law. It authorized the expenditure of $320 million for 250 projects and a number of examinations and surveys.

The 1936 act was the real beginning of comprehensive federal flood control work. It recognized that flood control was a "proper activity of the Federal Government in cooperation with States, their political subdivisions, and localities thereof." Since 1936, the Corps has built, pursuant to congressional authorizations and appropriations, over three hundred reservoirs whose primary benefit is flood control. Most of these reservoirs are multipurpose, however; many of them would not have been built had flood control been the only benefit.

It is noteworthy that so many Army Engineers maintained their skepticism of the value of flood control reservoirs despite the windfall of work Congress had given the Corps. Brigadier General Harley B. Ferguson, president of the Mississippi River Commission and a recognized expert in flood control, stated that reservoirs in the lower Mississippi basin "never were justified except for work relief." Some Corps engineers, both military and civilian, simply shared the skepticism of many private civil engineers who thought it difficult, if not impossible, to operate a flood control reservoir as a multipurpose project. According to Gerard H. Matthes, the senior engineer with the Mississippi River Commission, even single-purpose flood control reservoirs posed significant "practical operating difficulties." While such reservoirs can perform quite well in small watersheds such as the Miami Valley in Ohio, they were ill suited in "large drainage basins, or in any flood-control system in which a large number of dams and reservoirs are required, or where the tributary system is at all complex." A pamphlet entitled "Notes on Flood Control," which was circulated within the Office of the Chief of Engineers in August 1936, two months after passage of the flood control act, identified four methods of flood control:

building levees, enlarging the discharge capacity, providing additional channels, and constructing reservoirs. The pamphlet then noted:

> Of the four methods of controlling floods mentioned above, construction of levees is the most direct and surest method . . . . Works, such as reservoirs, constructed at localities distant from areas damaged by floods are not so determinate as to effects, and the benefits of reservoirs become smaller and smaller as distances from the reservoir sites increase. As a consequence, a dollar spent for levee construction is more likely to be a dollar well spent than a dollar spent for other methods of flood control.

Humphreys' and Abbot's influence waned very slowly. Only after World War II did the Engineer school at Fort Belvoir, Virginia, publish a booklet which listed reservoirs as a flood control option, without suggesting that it was necessarily the least attractive alternative.